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[Meeting report]

IAEA consultancy meeting on low-dose radiation for patients and population

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Abstract

This paper reports on the IAEA's Consultancy Meeting on "low-dose radiation for patients and population —Science, Technology and Society (STS) concepts for communication and perception among medical doctors and stakeholders—", which was held on October 21 and 22, 2020. The meeting consisted of seven presentation sessions, with a total of 27 presentations and 39 participants from seven countries. The meeting focused on various areas including environmental, food, and personal dosimetry ; radiation and other secondary health effects after nuclear disasters ; communication between medical professionals and patients or residents ; and medical education on nuclear accidents. This meeting was convened to discuss STS perspectives related to nuclear emergencies, to share the findings of the Fukushima Health Management Survey and the current situation in Fukushima with international experts. The meeting confirmed the importance of coordinated recovery of affected areas and global preparedness in the aftermath of nuclear accidents.

Key words : Education, Fukushima Health Management Survey, IAEA, Science, Technology and Society

Since December 2012, the International Atomic Energy Agency (IAEA) and Fukushima Medical University (FMU) have concluded Practical Arrangements on collaborative cooperation. The IAEA and FMU have been holding international meetings several times a year and prepared publications on medical education addressing various issues related to nuclear emergencies, including socio-scientific and technological issues, communication, and education in the setting of low radiation doses [1-4]. Domestic and international researchers have been involved and shared the findings of the Fukushima Health Management Survey[5)] as well as updates on the current situation in Fukushima. Within this framework, the IAEA's Consultancy Meeting on "Low-dose radiation for patients and population —Science, Technology and Society (STS) concepts for communication and perception among medical doctors and stakeholders—" was held on October 21 and 22, 2020. This paper reports on the meeting.

In the past, the meetings were held face-to-face, but due to the global outbreak of COVID-19, this meeting was held online, jointly organized by FMU and the IAEA. The presentation time was shortened in account of the time difference between countries. Infection control measures were thoroughly implemented at the FMU meeting hall, where many participants of FMU convened for the meeting. Sufficient time for discussion was allocated.

The presentations consisted of seven sessions (four on the first day and three on the second day),

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Table 1. Presenters, affiliations, and presentation titles. The affiliations are as of the time of the meeting.

Presenter	Affiliation	Presentation title
Opening		
Hitoshi Ohto	FMU, Japan	Opening remarks
May Abdel-Wahab	IAEA	Opening remarks
Session 1 STS Communication addressing low-dose radiation : The future (Chair : May Abdel-Wahab and Kenji Kamiya)		
Masaharu Maeda	FMU, Japan	Mental health issues after Fukushima disaster : Depression, risk perception and stigmatization
Hiroko Yoshida	Tohoku University, Japan	Toward improved communication and engagement on low-dose radiation risk with the general population
Dimitry Bazyka	National Research Center for Radiation Medicine of the Academy of Medical Sciences of Ukraine, Ukraine	Experience of implementation of the International Chernobyl Research and Information Network (ICRIN) project in Ukraine
Toyoaki Sawano	FMU, Japan	Lesson learnt from Fukushima disaster for nuclear disaster preparedness for vulnerable population
Session 2 The role of radiation in medicine education : The way forward (Chair : Michio Murakami and Uwe Scholz)		
Kenneth Nollet	FMU, Japan	Following Fukushima, following COVID : Leading education
Atsushi Kumagai	National Institutes for Quantum and Radiological Science and Technology, Japan	We need medical professionals to take ownership of their learning
Greg Clancey	Science, Technology, and Society (STS) Cluster, Asia Research Institute (ARI), National University of Singapore (NUS), USA	Dealing with the uncertainties around low-dose radiation in health-care education from an STS perspective
Samy El-Badawy	Department of Radiation Oncology, National Cancer Institute, Egypt	Radiation medicine education during emergencies
Chryzel Angelica B. Gonzales	Hiroshima University, Japan	Connecting the boundaries : The importance of radiation education to different professionals and members of the public
Session 3A Challenges encountered by medical professionals with the returning population “The Fukushima Perspective” (Chair : May Abdel-Wahab and Tomoaki Tamaki)		
Takashi Ohba	FMU, Japan	In hand, on hand : A new eHealth application with radiation records to connect returning evacuees to human services after a radiation accident
Noboru Takamura	Nagasaki University, Japan	Recovery efforts of the community after the nuclear disaster in Fukushima
Michiaki Kai	Oita University of Nursing and Health Sciences, Japan	10 years of radiological protection after the Fukushima — Need to share what radiological criteria are
Momo Takada	National Institutes for Quantum and Radiological Science and Technology/ National Institute of Advanced Industrial Science and Technology, Japan	Challenges with local residents in Yamakiya toward resumption of Satoyama usage

Session 3B Challenges encountered by medical professionals with patients exposed to medical radiation : The experiences of FMU medical doctors (Chair : Kiyoshi Saito and Uwe Scholz)		
May Abdel-Wahab	IAEA	Doctor-patient communication
Tomoaki Tamaki	FMU, Japan	Dose and effect of radiation exposure for medical purposes
Satoshi Tashiro	Hiroshima University, Japan	Biological effect of low-dose medical radiation
Takuya Nakamura	Nagasaki University, Japan	How to face medical radiation as radiological technologist – Experiencing the changes after the Fukushima nuclear accident
Session 3C Challenges encountered by professionals with the returning population : Agriculture, food, fisheries and environment (Chair : Masaharu Tsubokura and Uwe Scholz)		
Tatsuo Aono and Yutaka Yamada	National Institutes for Quantum and Radiological Science and Technology, Japan	Estimation of internal exposure dose from diet in daily life
Kimiaki Saito	JAEA, Japan	Temporal change of air dose rates in living environment
Aldo Malavasi	SBPC (Brazilian Society for Advancement of Science), Brazil	Contamination of agricultural products after a nuclear accident
Mai Takagi	National Institute for Environmental Studies, Japan	Preserving traditional food cultures in 'Satoyama' — Radiation dose from edible wild plants and mushrooms
Session 4 Establishing appropriate dissemination approaches (Chair : May Abdel-Wahab and Seiji Yasumura)		
Michio Murakami	FMU, Japan	Perspectives for risk perception studies after the Fukushima nuclear disaster
Masaharu Tsubokura	FMU, Japan	Overviews of secondary health issues after the Fukushima incident
Koichi Tanigawa	Futaba Medical Center, Japan	How do we leave the lessons learned from the Fukushima Daiichi Nuclear Power Plant accident ?
Session 5 Plan for potential future activities (Chair : Arifumi Hasegawa and Kenneth Nollet)		
Uwe Scholz	International Advisor Technical Cooperation, Germany	Opportunities for STS concepts and risk communications regarding low-dose radiation in medical education and training
Kenji Kamiya	FMU/ Hiroshima University, Japan	Strategic planning for risk communication of low dose radiation in the context of STS
Kiyoshi Saito	FMU, Japan	Plan of FMU activities to support education in radiation health risk science
Closing		
Kiyoshi Saito	FMU, Japan	Closing remarks
May Abdel-Wahab	IAEA	Closing remarks

with a total of 27 presentations (Table 1). Of these, five presentations were by young researchers.

Session 1, "STS Communication addressing low-dose radiation : The future," consisted of four presentations by Masaharu Maeda, Hiroko Yoshida, Dimitry Bazyka, and Toyoaki Sawano. The speakers addressed mental health, communication with the community, information network activities, and issues around vulnerable people evacuated after the nuclear accident. The participants also discussed the issues of risk perception after nuclear disasters, the significance of summarizing scientific findings as a unified message, and the evacuation process in natural and nuclear accidents.

In Session 2, "The role of radiation in medicine education : The way forward," Kenneth Nollet, Atsushi Kumagai, Greg Clancey, Samy El-Badawy, and Chryzel Angelica B. Gonzales gave presentations. The presenters introduced the state of education after the Fukushima accident and amid COVID-19 pandemic, the methodology of radiation education using active discussion among participants, the significance and examples of medical education on low-dose radiation protection, the implementation of radiation medicine education during the COVID-19 pandemic, and the importance of radiation education for multiple professions and the public. The discussion focused on the effects of radiation education for medical personnel, the significance of patient and public education, and the duplication of educational initiatives.

Session 3A, entitled "Challenges encountered by medical professionals with the returning population 'The Fukushima Perspective,'" consisted of four presentations, done by Takashi Ohba, Noboru Takamura, Michiaki Kai, and Momo Takada. They introduced the development of electronic applications for returnees, community recovery activities in the affected areas, updates on radiation protection in the decade after the Fukushima accident, and collaborative activities with local residents for the use of *satoyama* (community-based forests) in the affected areas. Discussions were held on the characteristics and commonalities between crisis communication and risk communication, the uncertainty of the linear no-threshold model and its impact on dialogue with residents, the benefits of dialogue with residents for researchers, and the significance of providing information to returning residents.

Session 3B, "Challenges encountered by medical professionals with patients exposed to medical radiation : The experiences of FMU medical doctors," was presented by May Abdel-Wahab, Tomoaki Tamaki, Satoshi Tashiro, and Takuya Nakamura. They introduced the factors that should be considered in communication between doctors and patients, the dose and effects of radiation exposure for medical purposes, the biological effects of low-dose medical treatment such as Computed Tomography scans, and the post-disaster experience of how radiologists should deal with medical radiation. There were discussions on how to explain the advantages and disadvantages of medical exposure, and how much detail should be given on and the relevant uncertainties.

In Session 3C, "Challenges encountered by professionals with the returning population : Agriculture, food, fisheries and environment," Tatsuo Aono and Yutaka Yamada presented insights on internal dose from daily diet after the Fukushima accident. Kimiaki Saito introduced temporal changes in air dose rates in the environment. Aldo Malavasi talked about pathways and countermeasures for crop contamination by radiation. Mai Takagi informed about dose measurements for wild vegetables and mushrooms in *satoyama*. The issues raised during the discussion included the attenuation of cesium concentration in fish and shellfish, measures to reduce cesium concentration in wild vegetables, methods to utilize airborne monitoring, as well as lessons to present information on food monitoring results and difficulties in communicating with residents regarding internal exposure results.

Session 4, "Establishing appropriate dissemination approaches," consisted of three presentations : Michio Murakami on the perspectives of risk perception research after a nuclear disaster, Masaharu Tsubokura on secondary health effects such as lifestyle-related diseases, and Koichi Tanigawa on the significance of communicating lessons learned from the Fukushima disaster in terms of information, education, culture, and institutions. During the discussion, insights were exchanged on the relationship between risk perception and education, the relationship between return to former evacuation zones and psychological distress, other future potential issues for returnees, and how to effectively allocate resources for future information dissemination.

Session 5, "Plan for potential future activities," included three presentations. Uwe Scholz presented STS concepts and risk communication in medical education and training. Kenji Kamiya talked about risk communication strategies in the context of STS. Kiyoshi Saito introduced educational activities in health risk science at FMU. The participants discussed several topics including differences in risk

perception among countries, the significance of involving medical personnel as communicators after disasters, and the importance of learning and communicating with the media.

In the end, 39 participants from 7 countries gathered from various fields such as medicine, radiation protection, and social sciences, demonstrating the diversity of this meeting. The areas presented also included environmental, food, and personal dosimetry ; radiation and other secondary health effects after nuclear disasters ; communication between medical professionals and patients or residents ; and medical education on nuclear disasters.

The meeting reaffirmed the significance of bringing together divers international and Japanese experts to share knowledge, and highlighted the importance of coordinated recovery of affected areas and global preparedness in the aftermath of nuclear accidents.

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